Instruction Manual

IEC® Micro MB Centrifuges

Cat. No.3413: 120 VAC, 50/60Hz (no rotor)
Cat. No.3414: 240 VAC, 50/60Hz (no rotor)
Cat. No.3415: 120 VAC, 50/60Hz (837 rotor)
Cat. No.3416: 240 VAC, 50/60Hz (837 rotor)
Cat. No.3411: 120 VAC, 50/60Hz (275 rotor)
Cat. No.3426: 240 VAC, 50/60Hz (275 rotor)

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Analyze • Detect • Measure • Control™

Thermo ELECTRON CORPORATION

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1. Introduction

1.1 Product Description

The IEC Micro MB is a portable benchtop centrifuge designed specifically for use as a micro hematocrit centrifuge (for in vitro diagnostic use) or a microcentrifuge, depending on which rotor is used.

There are six models:

- Cat. No. 3413 for 120 V, 50/60 Hz (No Rotor)
- Cat. No. 3414 for 240 V, 50/60 Hz (No Rotor)
- Cat. No. 3615 for 120 V, 50/60 Hz (837 Rotor)
- Cat. No. 3616 for 240 V, 50/60 Hz (837 Rotor)
- Cat. No. 3411 for 120 V, 50/60 Hz (275 Rotor)
- Cat. No. 3412 for 240 V, 50/60 Hz (275 Rotor)

The 837 rotor is a 45° fixed angle microtube rotor. The 275 rotor is a 24 place micro hematocrit rotor which requires a separate reader for reading the hematocrit test (IEC Reader No. 2201).

The Micro MB is a compact and quiet, single speed centrifuge that utilizes a power interrupt switch: when the cover is opened during rotation, power to the motor is removed. It has a momentary spin feature and a fast acting manual brake.

1.2 Hematocrit Test (using 275 rotor)

The micro method for determination of hematocrit has been widely used in clinical laboratories for many years. The results of micro hematocrit determinations are recognized as being fully equivalent to the results of macro determinations. The hematocrit is a quantitive test of the red cells and the plasma content of a micro sample of human blood.

The usual micro technique for determining hematocrit utilizes a small glass capillary tube, internally coated with an anticoagulant (heparin). This anticoagulant is non-reactive with the separation of blood cells and plasma and is placed inside of the capillary tube as a catalytic preservative. The tube is partially filled with blood obtained from a finger puncture. One end of the tube is sealed with plastic clay. The capillary tube is placed in a micro hematocrit centrifuge where it is spun at high speed for about 5 minutes. After centrifugation, the blood sample appears into two major fractions - a column of packed red cells and a column of clear plasma; with the small fraction of white cells and platelets between the major fractions.

The hematocrit is defined as the ratio of the volume of packed red cells to the volume of the original sample, multiplied by 100. Since the capillary tube is of uniform bore, the hematocrit may be easily determined by measuring the length of the column of packed red cells against the overall length of the blood sample. The hematocrit value may then be redefined as follows:

$$\text{HEMATOCRIT} = \frac{\text{length of column of packed red cell}}{\text{overall length of blood sample}} \times 100$$

Usually the two lengths are measured with the aid of special mechanical reading devices, such as the IEC reader (Cat. No. 2201). Such devices present the final hematocrit value without requiring any computation by the operator.

2. Installation

2.1 Receive the Unit

All units are shipped in protective packaging.

1. Follow the unpacking instructions on the carton.
2. Inspect the unit upon receipt and immediately file any damage claims with the shipper/carrier.
3. Complete and return the postage-paid warranty card.

2.2 Prepare the installation site

The unit normally resides on a bench top.

1. Place the centrifuge on a clean, dry surface, to make certain that the suction feet at the bottom grip the surface firmly. Keep the area beneath the unit free of debris and loose materials.

   ⚠CAUTION
   The resting surface must be level, to ensure quiet, vibration-free operation. A rigid and stable location is important. An improperly loaded centrifuge may vibrate or move

2. Locate the centrifuge to allow a clearance of 8 cm (3 inches) on all sides of the unit, to ensure proper ventilation.

⚠WARNING
International Electrotechnical Commission standard 1010 part 2-20 limits the permitted movement of a laboratory centrifuge to 12" (300 mm) in the unlikely event of a disruption. Laboratory management procedures should require that no person or any hazardous materials enter within this boundary while the centrifuge operates.

2.3 Verify Power Configuration

1. Verify that the correct power cord and connector is provided for your installation.

   The unit requires a grounded power supply (3-outlet).

   If your facility does not have grounded power outlets, arrange for proper grounding. The power cord plugs in on the left side of the unit.

⚠WARNING

ELECTRICAL HAZARD!
Do not remove the grounding pin from the centrifuge power cord. Do not use the bare wired power cord to attach a power plug that does not have a grounding pin.
The power cord provided with the unit is correctly rated for the highest current demand. This power cord should not be interchanged with cords from equipment with lower current demand. Exchange of power cords between equipment may create a fire hazard.

2. For best results, the refrigerated centrifuge should be used on a dedicated line. Variations in line voltage or frequency affect the unit's speed and other characteristics.
   NOTE:
   Less than nominal line voltage may prevent the centrifuge from reaching maximum published specifications of speed and/or temperature. Power line voltage, at some locations, may sag when the refrigeration system turns on

2.4 Moving the Unit

Suction cups at the bottom of the unit keep it anchored to the work surface. Keeping the unit stationary is a safety feature.

To move the unit to a new location:

⚠WARNING

Use caution when moving to avoid any injury.

1. Check that the new site meets the criteria in Section 2.2 before moving the unit.
2. Position a flat object, such as a tongue depressor, near a suction cup at the bottom of the unit.
3. Lift up an edge of the cup, and insert the flat object far enough to break the vacuum suction seal.
4. When all four suction cups are disengaged, lift the unit from the work surface.
5. When the unit is in its new location, ensure that the suction cups adhere correctly to the work surface

3. Operation

⚠WARNING

Do not open the cover before the rotor comes to a complete stop.

⚠CAUTION

For proper operation, always load the rotor symmetrically with a full (or at least paired) set of tubes. Verify that each tube is filled equally (by weight or at least visually) to its corresponding opposite.

⚠CAUTION

Do not block the vents because airflow will be restricted and overheating may take place.

3.1 Rotor Installation

1. Open the latch and lift the cover of the centrifuge.
2. Remove any locking nut that may be located on the head adapter (threaded shaft).
3. Place a rotor (275 or 837) onto the adapter making sure it engages the drive pins of the adapter. To do so, place one hand on the rotor and one hand on the shaft. Rotate the rotor and the shaft in opposite directions until you feel the rotor drop down onto the drive pins. Install the rotor locking nut onto the threaded shaft and tighten it using the spanner wrench.

275 Rotor

When using a 275 rotor it is first necessary to install the 1505 cushion.

1. Place the cushion so that it lines the inner side of the flange of the rotor making a smooth butt-joint with the ends. (It may be necessary to cut off a short piece of excess length to obtain the correct fit.) A thin layer of vacuum grease (IEC Part No. 2084) on the outer side of the cushion will provide sufficient adhesion to hold it in place and will facilitate replacement. Occasional shifting of the cushion will be necessary as it becomes punctured with use.

   ⚠CAUTION

   When loading hematocrit tubes into the 275 rotor, make sure that all tubes are touching the rubber cushion and that the other ends of the tubes do not protrude into the center recess in the rotor where the locking nut fits.

2. Place the rotor cover onto the adapter and tighten the knob onto the rotor until it is finger tight.

837 Rotor

Adapters come with each 837 rotor to allow smaller microtubes to be used.

The rotor directly accepts 11 mm diameter, 1.5 or 2.0 ml plastic microtubes.

- Use the black plastic adapters (IEC Part No. 5763) when using 8 mm diameter B-D (Becton Dickinson) Microtainers and 0.5 ml tubes.
- Use the white plastic adapters (IEC Part No. 5764) when using 6 mm diameter 0.4 and 0.25 ml tubes.

Balance

Install equal (by weight or by visual inspection) samples (including any adapters) in pairs across from each other in a rotor. Different adapters or tubes may be used in the same run provided they are balanced around the rotor as though they were the only samples in the rotor.

3.2 Starting and Stopping a Run

1. Plug the centrifuge in.
2. Close and latch the cover.
3. The centrifuge can be run in a Timed or Untimed Mode.
   - To run in the Timed Mode:
     Turn the timer knob clockwise to the desired setting. The run will start as soon as the timer knob is turned clockwise. Select a time up to 15 minutes in 30 second increments. If the desired run time is less than 5 minutes, turn the timer knob clockwise to the 5 minute mark and then back to the desired time. Changing the timer knob setting during a run affects the run in progress. When the timer knob returns to the 0 minute position, a signal bell sounds and the rotor coasts to a stop.
   - To run in an Untimed Mode:
     Set the timer knob to 0 minutes and press and hold the Momentary Spin button. The run will start as soon as this button is pressed, and will end as soon as it is released.

     NOTE: In either Mode, if faster stopping is desired, hold the brake switch down until the rotor has almost come to rest (approximately 5 seconds) and release the brake switch. The rotor can be seen through the top vent in the cover of the centrifuge.

     Note:The rotor will reverse direction of rotation if the brake switch is held down after the rotor stops.

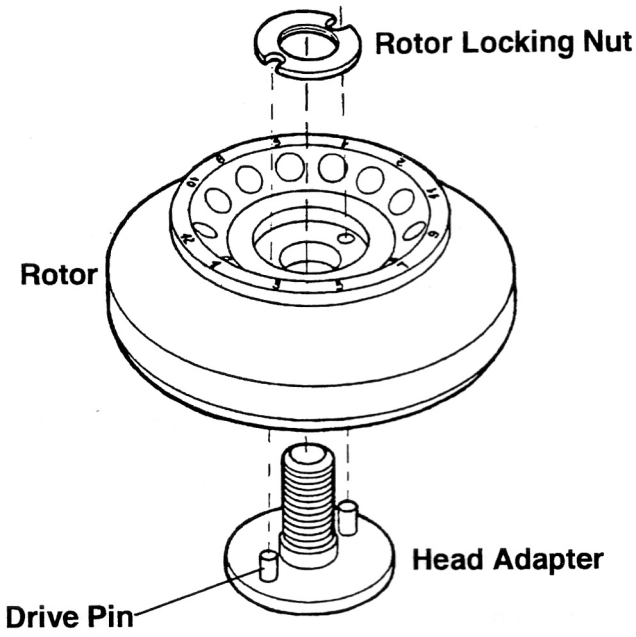
     ⚠WARNING

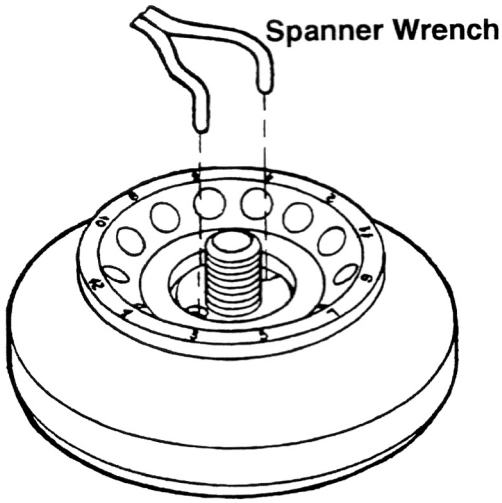
     Do not open the cover before the rotor comes to a complete stop.

     Note:The power will be interrupted and the brake switch will not function if the cover is opened.
4. Once the rotor has come to a complete stop, unlatch and lift the cover.

3.3 Rotor Removal

To remove the rotor, use the spanner wrench (Thermo Electron Part No. 1883) to loosen the locking nut(s) and lift the rotor off of the motor shaft.





Rotor Installation

4. Maintenance

4.1 Care and Cleaning

- Keep the centrifuge clean to ensure good operation and to extend its life.
- Clean the sample chamber, rotor, and lid, at the end of each work day, and immediately after any spill. Use a damp sponge, warm water, and a mild liquid detergent suitable for washing dishes by hand, such as Ivory® liquid. Do not use caustic detergents or detergents that contain chlorine ions. These attack metals.

  ⚠CAUTION
  Do not use caustic or acid cleaning agents. The 275 rotor will corrode when exposed to sodium or chlorine ions.

- Remove stubborn stains with a plastic scrub pad. Do not use steel wool, wire brushes, abrasives, or sandpaper as they create corrosion sites. Never pour water directly into the rotor chamber.
- Scrub the rotor's tube cavities with a stiff test tube brush that has end bristles and a non-metallic tip. After cleaning, dry each part with a clean absorbent towel.

  ⚠CAUTION
  In the case of glass breakage, be careful to remove ALL particles of glass from the unit! In particular, be sure thoroughly scrub adapters and cushions with a wire brush or replace these items as glass shards embedded in the adapters can cause further breakage.

4.2 General

The Micro MB motor requires no lubrication. The motor bearings are sealed, permanently lubricated bearings.

The Micro MB requires no calibration. Verification of speed is recommended every six months. The minimum speed of the centrifuge is 11,600 RPM.

If the centrifuge does not start, check that the cover switch is engaged when the cover is latched. If it does not engage, the latch can be tightened by adjusting the screw inside the latch assembly. When properly adjusted, a closed cover will compress the gasket slightly and the latch will be snug. If the latch is snug but a gap still exists between the cover and the gasket, the gasket must be replaced.

4.3 Brush Replacement

The motor brushes should be inspected every 3-4 months under normal use, and more often with heavy use.

1. Unplug the centrifuge, remove the rotor, and place the unit on a benchtop upside down.
2. Remove the three screws from the baseplate and remove the baseplate.
3. Unscrew the motor brush caps and remove the brushes. If the carbon portion of the brush is 1/4 inch or less, replace the brushes. When replacing the brushes, spread the metal clip on the end of the brush spring slightly, so that it will stay in the brush holder until the cap is screwed in. Order a pair of replacement brushes as IEC Part No. 1840. (A pair of brush caps is IEC Part No. 30895).

4.4 Storage: Keep the Unit Dry

Store parts on a soft surface to avoid damage.

Rotors and other parts should be clean and dry. Store them open to the air, not in a plastic bag, so any residual moisture evaporates. Face the parts upward to avoid moisture retention in the cavities.

4.5 Condition of Returned Equipment

Obtain a return goods authorization (RGA) before returning equipment to the manufacturer. The RGA paperwork includes a Certificate of Decontamination for you to sign. It indicates that you have performed the proper steps for decontaminating the unit.

⚠WARNING
All returned units must be decontaminated, free of radioactivity, and free of hazardous, infectious, pathogenic, or toxic materials.

All return equipment shipments will be refused until the signed certificate is received.

You must prepay transportation to the service depot.

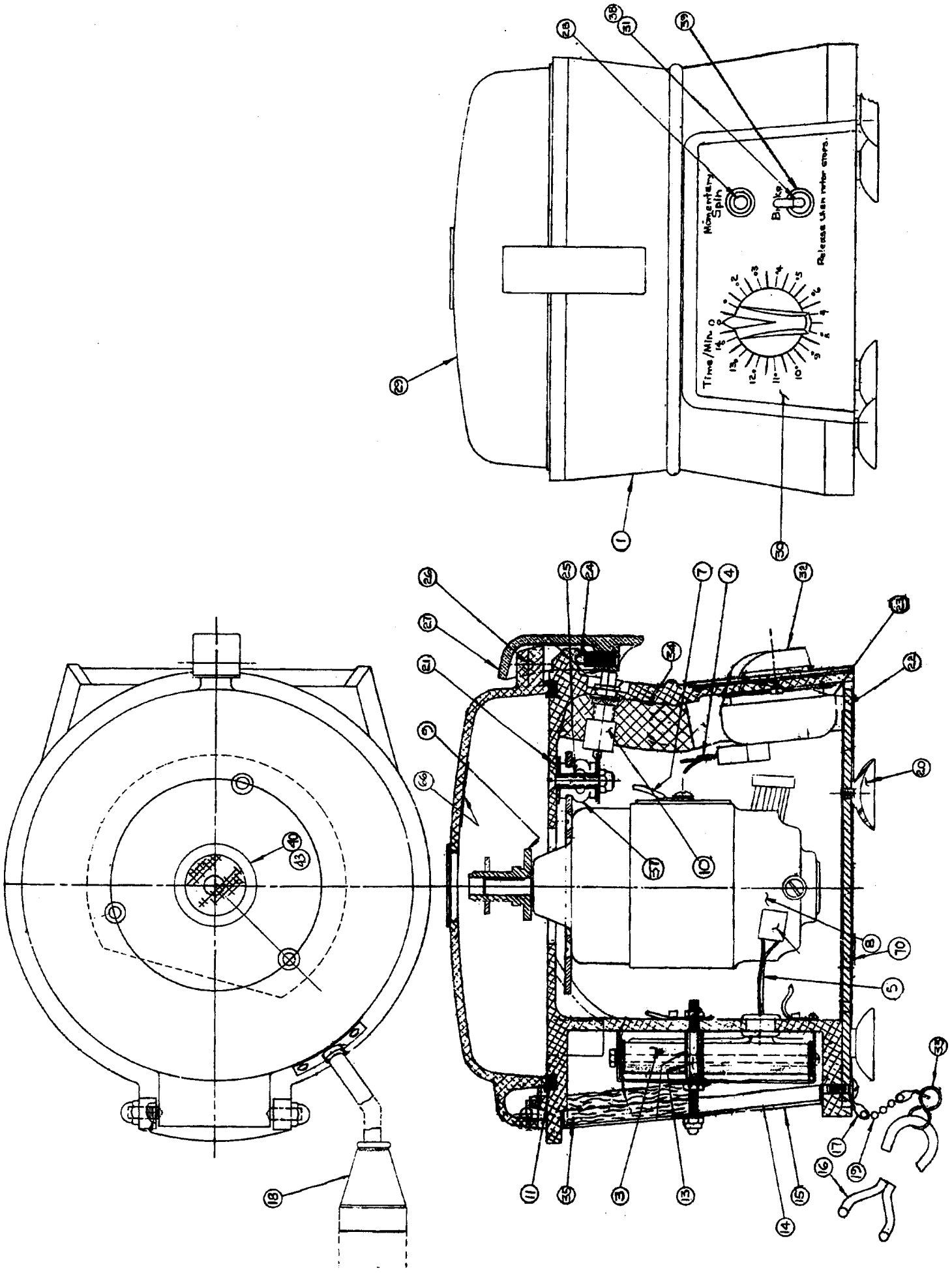
5. Specifications

Rotation Speed	11,600 RPM minimum 14,000 RPM maximum
Relative Centrifugal Force	13,200 xg (275 rotor) minimum 8,700 xg (837 rotor) minimum 19,200 xg (275 rotor) maximum 12,700 xg (837 rotor) maximum
Acceleration	Less than 10 seconds
Deceleration	Less than 5 seconds (brake) Approx. 45 seconds (coast)
Capacity	12 x 2.0 ml (837 rotor) 24 x Hematocrit Tubes (275 rotor)
Timer	
Range	0 to 15 minutes
Increments	30 seconds
Accuracy	± 5% full scale
Power Requirements and Output	
Voltage	120 VAC ± 10%, 50/60 Hz (Cat. No. 3411, 3613, 3615) 240 VAC ± 10%, 50/60 Hz (Cat. No. 3412, 3614, 3616)
Power Consumption	140 Watts (operating)
Heat Output (typical)	480 Btu/hr
Dimensions	
Cover Closed Height:	229 mm (9 in.)
Cover Open Height:	457 mm (18 in.)
Width	254 mm (10 in.)
Depth	279 mm (11 in.)
Unit Weight:	9.1 kg (20 lbs.)
Shipping Weight:	10.9 kg (24 lbs.)

Specifications subject to change without notice.

6. Drawings/Parts

Item No.	Description	120V	240V
1	Base	49780	
3	Brake Resistor	41313	
4	Harness - Power	49793	
5	Harness - Brake Res.	49794	
7	Ground Lead	33790	
8	Motor	44890	44891
9	Head Adapter	7915	
10	Switch (Latch)	49784	
11	Gasket (Cover)	1511	
13	Stud	30898	
14	Grommet	9660	
15	Screen	30889	
16	Spanner Wrench	1883	
17	Coupling	30901	
18	Power Cord	38805	46759
19	Bead Chain	7907	
20	Foot	46618	
21	Washer	30888	
22	Base Plate	30877	
23	Timer	768	
24	Screw	65455	
25	Spacer	30882	
26	Latch Pin	30887	
27	Latch	30878	
28	Switch (Spin)	49789	
29	Cover	49771B	
30	Front Panel	49788	
31	Switch (Brake)	9942	
32	Timer Knob	30839	
33	'S' Hook	30902	
34	Liner	42991	
35	Insulation	31675	
37	Motor Dampener	30992	
38	Vinyl Tip	45390	
39	Knurled Nut	42011	
40	Vent Screen	30900	
43	Washer	49224	
66	Label	50012	
70	Label	46625	


Momentary Spin
Brake
Release Lid to reset timer
Time/Min
0
2
3
4
5
6
7
8
9
10
11
12
13
14
15

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REVISIONS						
REV	ZONE	BY	DATE	ECO	APP'D	DATE
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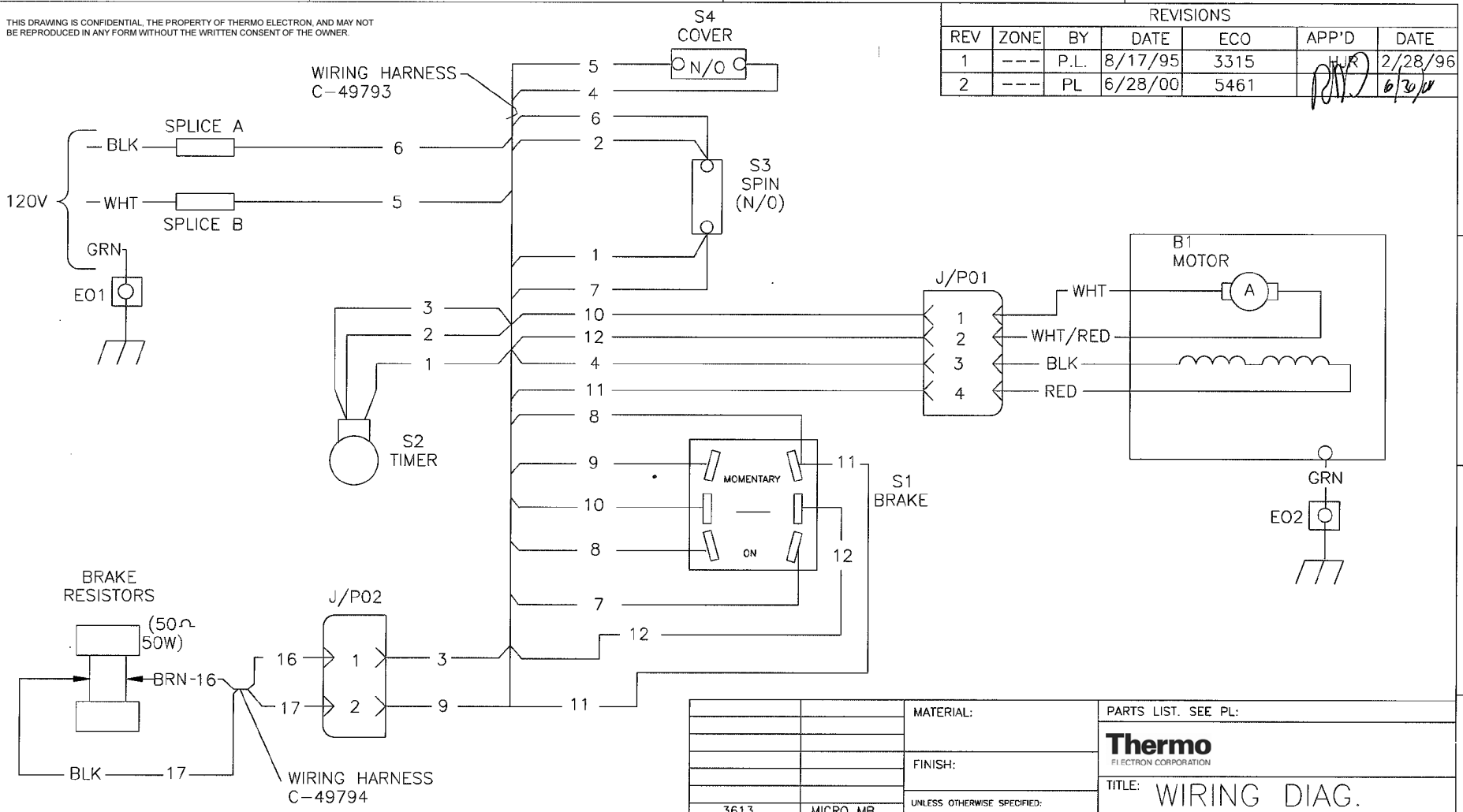
2	---	PL	6/28/00	5461		6/30/00



3613	MICRO MB		
NEXT ASSY	USED ON		
APPLICATION			
	BY	DATE	
DRAWN	JM	6/18/84	
CHECKED	PL	6/26/84	
APPROVED	ATK	6/17/84	

MATERIAL:

FINISH:

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHS.
DIMENSIONS ARE AFTER FINISH.
REMOVE ALL BURRS & SHARP EDGES.
SURFACE QUALITY ✓

TOLERANCES		
2 PLACE DEC.	3 PLACE DEC.	ANGLES
±.02	±.005	±½

PARTS LIST. SEE PL:

Thermo
ELECTRON CORPORATION

TITLE: WIRING DIAG.
MICRO MB 120V

SIZE:	CODE ID. NO.	DRAWING NO.	REV.
B		10688	2

SCALE: 1=1 SHEET 1 OF 1

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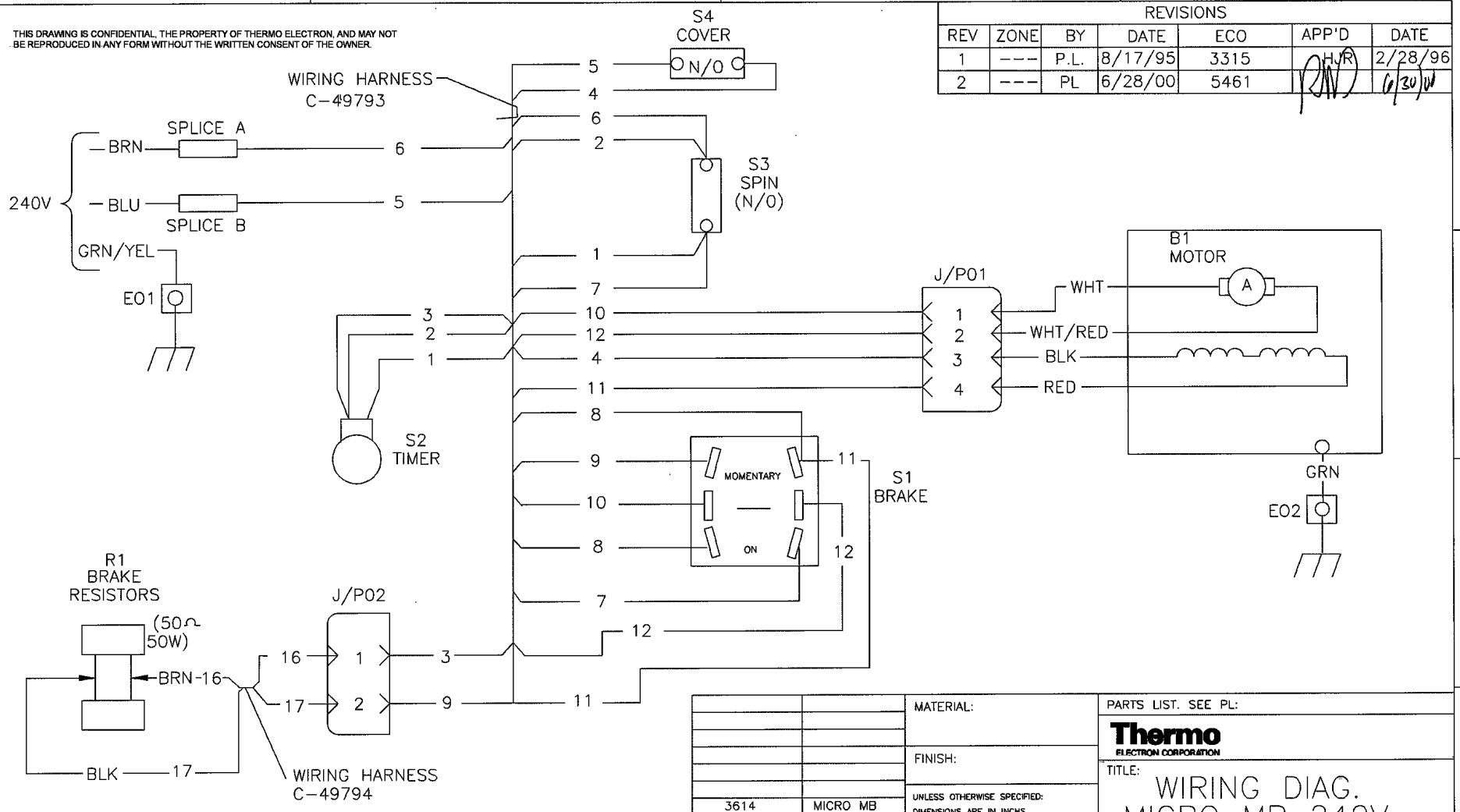
2	---	PL	6/28/00	5461		6/30/00



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APPLICATION			
	BY	DATE	
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CHECKED	PL	6/26/84	
APPROVED	ATK	6/17/84	

MATERIAL:

FINISH:

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SURFACE QUALITY ✓

TOLERANCES		
2 PLACE DEC.	3 PLACE DEC.	ANGLES
± .02	±.005	±½

PARTS LIST. SEE PL:

Thermo ELECTRON CORPORATION

TITLE:
WIRING DIAG.
MICRO MB 240V

SIZE:	CODE ID. NO.	DRAWING NO.	REV.
B		10689	2

SCALE: 1=1 SHEET 1 OF 1

Notes

Warranty

Thermo warrants that the Products will operate substantially in conformance with Thermo's Specifications applicable to such Products, when subjected to normal, proper and intended usage by properly trained personnel, for a period of twenty-four (24) months from the date of installation, not to exceed thirty (30) months from date of shipment from Thermo (the "Warranty Period"). Thermo agrees during the applicable Warranty Period, provided it is promptly notified in writing upon the discovery of any defect and further provided that all costs of returning the defective Products to Thermo are pre-paid by Purchaser, to repair or replace, at Thermo's option, non-conforming Products so as to cause the same to operate in substantial conformance with said Specifications. Such repair shall include parts only during the final twelve (12) months of the Warranty Period. Replacement parts may be new or refurbished, at the election of Thermo. All replaced parts shall become the property of Thermo. Lamps, fuses, bulbs and other expendable items are expressly excluded from the warranty. Thermo's sole liability with respect to equipment, materials, parts or software furnished to Thermo by third party suppliers shall be limited to the assignment by Thermo to Purchaser of any such third party supplier's warranty, to the extent the same is assignable. In no event shall Thermo have any obligation to make repairs, replacements or corrections required, in whole or in part, as the result of (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) misuse, fault or negligence of or by Purchaser, (iv) use of the Products in a manner for which they were not designed, (v) causes external to the Products such as, but not limited to, power failure or electrical power surges, (vi) improper storage of the Products or (vii) use of the Products in combination with equipment or software not supplied by Thermo. If Thermo determines that Products for which Purchaser has requested warranty services are not covered by the warranty hereunder, Purchaser shall pay or reimburse Thermo for all costs of investigating and responding to such request at Thermo's then prevailing time and materials rates. If Thermo provides repair services or replacement parts that are not covered by the warranty, Purchaser shall pay Thermo therefore at Thermo's then prevailing time and materials rates. ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN THERMO WITHOUT THERMO'S PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY THERMO, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS.

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